

3/PRTS

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## BACK PROTECTOR, IN PARTICULAR FOR MOTORCYCLISTS

### FIELD OF THE INVENTION

This invention to a back protector, in particular for motorcyclists.

### DESCRIPTION OF THE PRIOR ART

5 Protectors for body parts are known. In certain cases they consist of substantially rigid paddings and/or shields which in the case of a fall absorb the impact, to protect those parts of the motorcyclist's body most exposed to injury and fracture (shoulders, elbows, knees, etc.).

10 These elements are applied to the motorcyclist's suit and generally comprise an outer shell constructed of substantially rigid plastic, an inner layer able to absorb the impact energy, and a layer of soft material provided with means for its fixing to the suit.

15 With regard to back protection, belts are known in the form of a band provided at its rear with a plurality of substantially rigid elements, each consisting of a plate arranged vertically aligned with partial overlap between each plate and the adjacent plate.

20 In the motorcyclist field the objective is to achieve maximum protection of that part of the spinal column comprising the spinal cord, because of the seriousness of possible injury in that anatomical region. As the vertebrae involved by the spinal cord comprise the thoracic vertebrae (as far as the twelfth) and the first two lumbar vertebrae, ie a position which for an individual of average height reaches a few centimetres above the waistline, this belt provides protection in that anatomical region.

25 However, as the protective action preferably also extends to the remaining portion of the spinal column, ie for the remaining lumbar vertebrae,

such back protectors extend below the waistline to also cover part of the glutei.

This protection system has however the drawback that the rigidity of the structure opposes lateral flexure of the trunk and forward and rearward bending, so interfering with the movements required during driving.

EP-A-0 212 206 discloses a plurality of plates which are placed in overlapping relationship in an elongated array extending along the spinal column or other body area to be protected. The plates are pivotally interconnected by joints which allow relative rotation to a limited extent between the plates and limited longitudinal movement between the plates so that the armor structure conforms to body changes during normal movements. Overextension is prevented by abutment of the plates against each other, limiting harmful movement of the protected body portions.

An object of the invention is to eliminate these drawbacks by providing a back protector for the spinal cord and glutei of the spinal column which however allows free lateral flexure of the trunk and forward bending but only moderate rearward bending, while always performing its protective function.

#### ~~BRIEF SUMMARY OF THE INVENTION~~ Summary of the Invention

This and further objects which will be apparent from the ensuing description are attained according to the invention by a back protector, in particular for motorcyclists, comprising two vertically aligned supports provided with means for their fixing to a motorcyclist's body, each of said supports carrying a plurality of substantially rigid elements fixed thereto, said lower support being hinged to said upper support on a pin..

#### BRIEF DESCRIPTION OF THE DRAWINGS

This invention is described in detail hereinafter with reference to the accompanying drawings, on which:

Figure 1 is a schematic view of a protector according to the invention,

Figure 2 is a front view thereof,

5 Figure 3 is an enlarged cross-section therethrough on the line III-III of Figure 2,

Figure 4 is an enlarged cross-section therethrough on the line IV-IV of Figure 2, and

10 Figure 5 is a an enlarged cross-section therethrough on the line V-V of Figure 2.

#### DESCRIPTION OF PREFERRED EMBODIMENTS

As can be seen from the figures, the back protector according to the invention comprises a substantially elliptical upper element 2 extending through a length such as to cover the thoracic vertebrae and the first two lumbar vertebrae, and an underlying element 4 of length such as to cover the remaining lumbar vertebrae and part of the glutei.

15 In particular, the element 2 consists of a layer of soft expanded material 6 provided with braces 8, an intermediate layer 9 of soft material able to absorb the impact energy, and a plurality of superposed plates 10 (four in the illustrated example), the inner surface of each plate comprising a plurality of ribs 12 which mutually intersect to form a honeycomb structure.

Besides providing each plate with the mechanical strength enabling it to distribute the effects of a concentrated impact, the honeycomb structure itself absorbs a part of the energy to deform by deflection on impact.

Sub B12

Each plate 10 has a depressed lower end portion 14 on which the upper end 16 of the underlying plate is superposed.

5 The lower element 4 comprises substantially an inner layer 18 of expanded soft material to which there are applied a soft material layer 20 to absorb the impact and two plates 22. The upper plate of the element is hinged on an end pin 26 to the lower end of the lower plate 29 of the upper element 2.

10 The type of connection between two adjacent plates both of the upper element 2 and of the lower element 4 is shown in Figures 4 and 5. It is made by hinge elements which enable the plates to rotate relative to each other without fissures or cavities being created between one plate and the next.

The expanded material layer 18 is fixed at both ends to a support belt 28 which is secured to the motorcyclist's waist.

15 The plate structure allows free forward bending movement and follows the back profile in the various positions assumed by the driver.

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20 From the foregoing it is apparent that the protection element of the invention not only provides total protection to the vertebrae of the spinal cord and of the gluteus part, but also, by virtue of the hinging of the two parts and of the hinging between adjacent plates, enables the bust to flex laterally and to bend forward and backward.

Sub B13

Braces and belts have been used in the illustrated embodiment, however the invention also allows the use of support means in the form of buttons, zip fasteners and any element enabling the back protector to be applied to a jacket, a suit or any other article of clothing.